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Lesson Plan 01	INTRODUCTION
Lesson Plan 02	TIRE HISTORY
Lesson Plan 03	TIRE MARKETS
Lesson Plan 04	TIRE STORAGE
Lesson Plan 05	SOURCES OF IGNITION
Lesson Plan 06	CODES & REGULATIONS
Lesson Plan 07	GROUND RUBBER
Lesson Plan 08	PRE-PLANNING
Lesson Plan 09	FIRE BEHAVIOR
Lesson Plan 10	HAZMAT RESPONSE



STATE FIRE TRAINING

MISSION STATEMENT

The mission of State Fire Training is to enable the California fire service to safely protect life and property through education, training, and certification.

ACKNOWLEDGMENTS

The Code Development and Analysis Division of the Office of the State Fire Marshal developed the material contained in this guide.

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“We gratefully acknowledge the hard work and accomplishments of those before us who built the solid foundation on which this program continues to grow.”



COURSE STRUCTURE

This class is a revision and update of the original “Rings of Fire” training program produced by the Training Division of the State Fire Marshal’s Office. The rewrite of this class was made possible by a report entitled, “Tire Pile Fires; Prevention, Response, Remediation, Environmental Engineering and Contracting” September 23, 2002, commissioned by the California Integrated Waste Management Board. This base document was dissected by the California Tire Fire Council, a group of fire prevention and training officers, hazmat experts, and scrap tire industry spokespersons for appropriate content to be delivered to first responders, local enforcement agencies and tire dealers and operators.

This program is designed as an 8-hour class. It can be customized to accommodate one or two-hour crew training, or you can use this curriculum in conjunction with other hazardous material or fire code training programs. The opened-ended design of the course materials purposely allows the instructor a great deal of flexibility and course delivery options.

STUDENT PROFILE

TARGET GROUP

First responders, local enforcement agencies, scrap tire dealers, owners and operators.

PREREQUISITES

None

DESIRED ATTENDANCE TIME FRAME

None

CLASS REQUIREMENTS AND SPACE

The characteristics of the classroom and support facilities have a great impact on the learning environment and the instructor's success or failure. For this course, it is advisable for the instructor to adhere as closely as possible to the following guidelines.

CLASSROOM EQUIPMENT

- Writing board with markers/erasers
- PC projector
- Projection screen
- VCR or DVD player
- Audio System (Speakers and Amplifier)

MATERIALS

- "Rings of Fire" Instructor Guide
- "Rings of Fire" Video (VHS or DVD)
- "Rings of Fire" Student Text
- "Rings of Fire" Student Handout
- Multimedia slide show on CD/ROM

INTRODUCTION TO THE INSTRUCTOR GUIDE

This publication is intended to serve as an instructor guide and includes lesson plans, a slide index, student activities, and tests. For each topic identified in the course outline, a lesson plan has been developed that contains: a time frame, level of instruction, behavioral objective, materials needed, references, preparation statement, lesson content, and endnotes. Suggested application methods have been identified throughout the lessons for you to use during your presentation.

- **Time Frame:** The estimated duration required for in-class presentation.
- **Level of Instruction:** Identifies the instructional level that the material was designed to fulfill. Obviously, you have the latitude to increase the level based on available time, local conditions, and the students' apperceptive base.
- **Behavioral Objective:** The behavioral objective is a statement of the student's performance desired at the end of instruction. You must ensure that enough information is given in the presentation and/or activities to enable the student to perform according to the goal.
- **Materials Needed:** This should be a complete list of everything you will need to present the lesson, including visual aids, tests, and so on.
- **References:** These are the specific references the curriculum development team used when developing the lesson plan. In addition, references may be listed as additional study aids for instructors to enhance the lesson -- books, manuals, bulletins, scripts, visual aid utilization plans and the like. The corresponding pages in the student supplement are also listed here.
- **Preparation:** The motivational statements in this section connect the student with the lesson plan topic through examples or illustrations relating to their occupation, injury, and even mortality. You may modify this section to better fit your students' environment.
- **Lesson Content:** Includes information used in the four-step method of instruction.

Technical Lesson Plans	
<u>Presentation</u> Everything you say or display Content Notes	<u>Application</u> Everything the student participates in Questions Activities Audiovisual Cues

MULTIMEDIA PRESENTATION

The multimedia presentation was developed in a program called “Astound.” You do not need the software or license to run this program. It is suggested that you transfer by clicking and dragging the presentation file from the CD-ROM to a file on your hard drive. While the program will run from the CD, it runs even better off of your hard drive.

The presentation and your lesson plans are set-up to allow you to customize the delivery of this program into short subject courses for one or two-hour crew training or as an eight-hour stand-alone class. To enable this function, a menu slide was added for your convenience to navigate specific subject areas.

When you get to the end of the lesson the slide will automatically advance back to the menu slide. To advance the slides click on the left mouse button. You can also use your left and right arrow keys to advance or go back to a previous slide. To go to another section of the program click and hold your right mouse button and release. A small window displaying all of the slides will appear. To exit this program at any time simply hit the escape key on your computer or you can use the exit button on the “Main Menu.”

There are several unique pens available on your presentation. To change pen color and function use the following key code:

F2 Black Pen— handy for circling or to use to check bulleted items.

F3 Red Pen—handy for slides with a dark background to highlight certain information.

F4 Yellow Highlighter—used like a regular highlighter and not obscure the text.

F5 Pink Highlighter—provides you an option with the yellow highlighter.

To make the pens work, click and hold you left mouse button, and while its held down move the mouse across the slide. Experiment and practice with these pens to customize the delivery of your presentation.



COURSE OUTLINE

Course Objectives: To provide the student with...

- a) Background and history of scrap tire industry
- b) Chemical compounds in tire manufacturing
- c) Traditional sources of ignition
- d) Current codes and regulations
- e) Ground rubber operations and hazards
- f) Pre-fire planning of outdoor tire storage yards
- g) Tire fire behavior
- h) Hazardous Materials Response

Course Content	
Introduction – Defining the Problem	0:30
Tire History	0:30
Tire Markets	0:30
Tire Storage	0:30
Sources of Ignition	0:30
Codes and Regulations	1:00
Ground Rubber	0:30
Preplanning	0:30
Fire Behavior	0:30
Hazmat Response	1:00

TEXTS AND REFERENCES

- Slaughter, Rodney, “RINGS OF FIRE: Tire Fire Prevention and Suppression” California State Fire Marshal, June 2004.

CALENDAR OF EVENTS

DAY	TOPIC	TITLE	TIME	ACTIVITY	EVALUATION
Day 1	1	Introduction – Defining the Problem	0:30	Lecture	Test
	2	Tire History	0:30	Lecture	
	3	Tire Markets	0:30	Lecture	
	4	Tire Storage	0:30	Lecture	
	5	Sources of Ignition	0:30	Lecture	
	6	Codes & Regulations	1:00	Lecture	
		Lunch	1:00		
	7	Ground Rubber	0:30	Lecture	
	8	Preplanning	0:30	Lecture	
	9	Fire Behavior	0:30	Lecture	
	10	Hazmat Response	1:00	Lecture	
Day 1 Total			7:00		

INSTRUCTOR EVALUATION

To pass this class, and get an FSTEP certificate, students need to score 70%. In other words, students can only miss 6 out of the 20 questions on this evaluation.

1. California generates approximately 10% of all the scrap tires in the country.

True- California generates over 30 million and 300 million are generated annually in the U.S.
2. Carbon was added to the tires chemistry, so if a tire does catch on fire it will burn cleaner and faster.

False- Carbon was added to reduce wear.
3. The pyrolytic oil generated from a tire fire is no more hazardous than crankcase oil.

False- Pyrolytic oil has a higher concentration of harmful chemicals.
4. The largest market for scrap tires in California is in the production of ground rubber.

True- California uses 15 million tires in the production of crumb or ground rubber.
5. The amount of heat released by one pound of tire material is 7,400 BTU or 17,242 kilojoules per kilogram.

False- one pond of tire material generates 15,000 btu per pound or 34,950 kilojoules per kilogram.
6. Outdoor tire storage is typically randomly stacked regardless of code application.

True- Randomly stacked tires take less effort than other storage methods.
7. Wildland fires are the leading cause of tire pile ignitions.

False- Historically, arson is the leading cause of tire fires.
8. Local fire departments cannot enforce CIWMB regulations unless adopted locally.

True- Local fire departments can however use national recognized standards according to Title 19.

9. Having other agencies participate in local enforcement is a good idea.

True- A Unified Enforcement program produces better results.

10. The 2002 edition of NFPA 230 Annex F, provides a complete standard for outdoor tire storage.

True- NFPA is more complete than the current Uniform Fire Code which only restricts tire pile size.

11. Tire piles of 5,000 or less do not need a permit from the CIWMB.

False- Tire piles of 500 to 5,000 require a minor waste tire permit from CIWMB.

12. The best way to reduce outdoor tire storage (and avoid regulation) is to lease an empty unsprinklered warehouse and store the tires indoors.

False- Unscrupulous operators do this to avoid detection and regulation.

13. Processing operations that produce crumb or ground rubber have a high incidence of fires.

True- from retreading operations to ground rubber facilities, tire fires are common.

14. Large piles of tires can be found in automotive salvage yards, solid waste facilities, property dedicated to tire storage, retreading shops, agricultural areas, and ground rubber facilities.

True- Stock piles of tires can be found in a wide range of places.

15. The pre-fire plan should include contact info for state and federal agencies.

True- State and federal agencies can order up the resources you will need to combat this emergency.

16. The best way to fight a fully involved tire fire is to protect exposures until the pile is in the smoldering phase and then using heavy equipment pull the tire pile apart and extinguish incrementally.

True- Other methods will endanger personnel or exacerbate the impact of the environment.

17. Suppliers of foam products specifically designed for tire fires should be identified, and the amount needed, in your pre-fire plan.

False- Foam has not proven to be any better than water on tire fires, with the exception of small tire fires of 500 or less.

18. Tire fires are not a hazardous materials response.

False- The products of combustion have a very high health hazard concern for those operating in and around the tire fire.

19. Ground or crumb rubber piles have lower flame lengths and can be extinguished with water applied in a fog pattern.

True- altered tire material has lower flame lengths and is easier to extinguish.

20. Covering a tire pile fire with earth is the fastest way to extinguish a tire fire.

False- burying a tire fire allows it to continue to burn creating more pyrolytic oil and larger environmental impact.

Student Evaluation

Read each statement and circle either true or false
if you agree or disagree with the statement.

1. California generates approximately 10% of all the scrap tires in the country.
True - False
2. Carbon was added to the tires chemistry, so if a tire does catch on fire it will burn cleaner and faster.
True - False
3. The pyrolytic oil generated from a tire fire is no more hazardous than crankcase oil.
True – False
4. The largest market for scrap tires in California is in the production of ground rubber.
True – False
5. The amount of heat released by one pound of tire material is 7,400 BTU or 17,242 kilojoules per kilogram.
True – False
6. Outdoor tire storage is typically randomly stacked regardless of code application.
True – False
7. Wildland fires are the leading cause of tire pile ignitions.
True - False
8. Local fire departments cannot enforce CIWMB regulations unless adopted locally.
True - False
9. Having other agencies participate in local enforcement is a good idea.
True – False

10. The 2002 edition of NFPA 230 Annex F, provides a complete standard for outdoor tire storage.

True – False
11. Tire piles of 5,000 or less do not need a permit from the CIWMB.

True - False
12. The best way to reduce outdoor tire storage (and avoid regulation) is to lease an empty unsprinklered warehouse and store the tires indoors.

True – False
13. Processing operations that produce crumb or ground rubber have a high incidence of fires.

True - False
14. Large piles of tires can be found in automotive salvage yards, solid waste facilities, property dedicated to tire storage, retreading shops, agricultural areas, and ground rubber facilities.

True – False
15. The pre-fire plan should include contact info for state and federal agencies.

True – False
16. The best way to fight a fully involved tire fire is to protect exposures until the pile is in the smoldering phase and then using heavy equipment pull the tire pile apart and extinguish incrementally.

True – False
17. Suppliers of foam products specifically designed for tire fires should be identified, and the amount needed, in your pre-fire plan.

True - False
18. Tire fires are not a hazardous materials response.

True – False

19. Ground or crumb rubber piles have lower flame lengths and can be extinguished with water applied in a fog pattern.

True – False

20. Covering a tire pile fire with earth is the fastest way to extinguish a tire fire.

True - False